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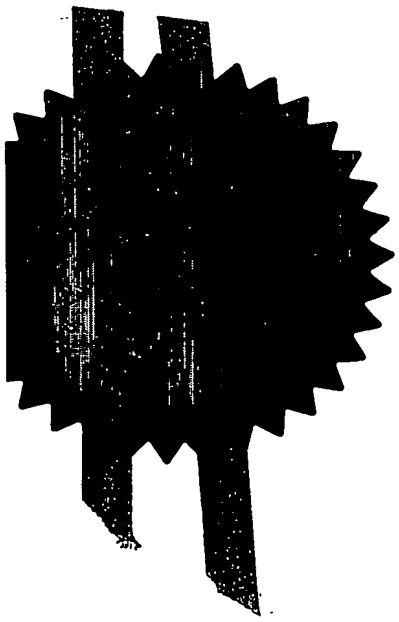
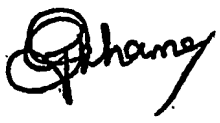


Signed 

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2. Patent application number
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20 MAR 2003
0306367.4

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Stannah Stairlifts Limited
Watt Close
East Portway
ANDOVER
Hampshire SP10 3SD

Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation

England

5650239001

4. Title of the invention

Improvements in or relating to Stairlifts

5. Name of your agent *(if you have one)*

Ipca Consulting Limited
Northpoint House
52 High Street
Knaphill
Surrey GU21 2PY

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

(51/77 - 3.3.04)
Urquhart-Dykes & Lord
Alexandra House
1 Alexandra Road
Swansea
SA1 5ED

Patents ADP number *(if you know it)*

1644005

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Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

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Number of earlier application	Date of filing *(day / month / year)*

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Signature Andrew Harris Date 18.03.2013

12. Name and daytime telephone number of person to contact in the United Kingdom Andrew Harris 01483 489818

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IMPROVEMENTS IN OR RELATING TO STAIRLIFTS

Field of the Invention

This invention relates to stairlifts and, in particular, to a control interface through which a stairlift user may operate a stairlift.

Background to the Invention

Stairlifts are typically used by persons having limited mobility. The limitation in mobility often includes limited manual dexterity. This latter point is relevant when it comes to operating the stairlift, since the stairlift controls are almost universally hand operated.

One common form of operating control currently used on stairlifts comprises a joystick. Typically the joystick is positioned at the outer end of an armrest forming part of a stairlift chair. The joystick projects vertically upwards from the armrest and terminates in a knob or ball. The user must vertically rotate the wrist so as to locate the knob or ball in the palm of the hand. Once so located, horizontal rotation of the wrist displaces the joystick so as to control the operation of the stairlift carriage.

The positioning of the joystick is generally convenient once the user is seated in the stairlift chair, although users with long forearms may find themselves having to displace their elbow rearward to an uncomfortable extent in order that the joystick may be accommodated comfortably in the palm of the hand. There is nothing which can be done to alleviate this problem since the joystick assembly is fixed into the armrest.

Often a stairlift user finds it necessary to steady themselves, when mounting the stairlift chair by, placing a hand on the armrest. The positioning of a joystick at the end of the armrest often interferes with this activity. Not only may the stairlift be

unintentionally operated should the mounting user inadvertently bump the joystick but further, a joystick applies point loading to a user's palm and this loading would be accentuated to an intolerable level if a substantial part of the user's body weight was applied to the joystick when mounting the chair. Indeed, the joystick assembly might not survive a user's weight being applied thereto.

One common alternative to the joystick control described above, is the use of push-buttons on the arm rest. As with the joystick control the positions of the push-buttons are fixed on the arm rest and this may cause some discomfort to those having long forearms. Further, as with joystick controls, push-button controls are susceptible to inadvertent operation and it is generally recognized that push-buttons can be fiddly to operate, particularly by persons having impaired manual dexterity.

At least one attempt has been made to address some of the problems encountered with the controls described above. European Patent Application 0 915 952 describes a control interface for a stairlift in the form of a disc mounted on the outer end of a chair armrest. The disc has a convex upper surface which is comfortable for reception in the palm of a user's hand, however the lower edge of the disc forms a sharp edge which is so designed as to enable a user to hook the thumb under the control. For persons having limited manual dexterity, this action may prove difficult if not impossible, and it would certainly not be possible to wrap the hand around the control or to operate the control comfortably using the side of the hand. Further, the fixed position of the control on the armrest means that those users with longer forearms will still be susceptible to the types of discomfort mentioned above and, as with the forms on control mentioned above, this type of control may be operated inadvertently.

A further characteristic of existing stairlifts is that they almost invariably include a key to isolate the stairlift when not in use. In many cases this key is mounted on the underside of the armrest adjacent to the joystick and it can be very difficult for persons having limited hand dexterity to operate the key. Another problem with keys

is that it can be difficult to establish, at a glance, if the key is in the on or off position, and a user may complain that the stairlift is defective when, in fact, the only problem is that the key is in the off position.

It is an object of the present invention to provide an operating interface for a stairlift which goes at least some way in addressing at least some of the aforementioned problems; or which will at least provide a novel and useful choice.

Summary of the Invention

Accordingly, in one aspect, the invention provides a stairlift chair including a pair of arm rests, each of the said arm rests having an upper surface; and a control interface mounted on one of said arm rests, said chair being characterized in that said control interface has a palm contacting surface displaceable in to a plane which is substantially co-incident with the upper surface of the arm rest to which said interface is attached.

Preferably the said control interface is displaceable with respect to orthogonal planes.

Preferably said control interface is constructed and arranged to avoid point loading on a user's palm when in use.

Preferably said control interface has a substantially planar upper surface and side surfaces aligned substantially perpendicularly to said upper surface.

Preferably said arm rest has a longitudinal axis, the position of said control interface being adjustable along said longitudinal axis.

Preferably said control interface has a major axis, said major axis being angled to said longitudinal axis in a horizontal plane.

Preferably said control interface is biased upwardly out of the plane of said armrest.

Preferably a power isolation switch is embodied in said interface.

In a second aspect the invention provides a stairlift chair including an arm rest having an inner end, an outer end, and a longitudinal axis; and a control interface positioned on or adjacent said outer end of said armrest, said chair being characterized in that the position of said control interface is adjustable along said longitudinal axis.

Preferably said control interface is displaceable with respect to orthogonal planes.

In a third aspect the invention provides a manually engageable control interface for a stairlift, said interface being characterized in that it is discreet from a chair armrest and includes a palm contacting surface constructed and arranged to avoid point loading on a user's palm, when in use.

Preferably said control interface includes side surfaces to permit smooth contact by the side of a user's hand.

Preferably said palm contacting surface is constructed and arranged to underlie at least 50% of the area of a user's palm.

In a fourth aspect, the invention provides a manually engageable control interface for a stairlift, said interface including a body member engageable in the palm of a user's hand when said stairlift is in use, said interface being characterized in that said body member is formed in two parts which are displaceable with respect to one another such that, in a first configuration of said two parts, said control interface is inactive.

Preferably, when said body parts are in said first configuration, the resulting form of said body differs visually and/or provides a different tactile sensation to the user's hand than when said body parts are in an operative configuration.

In a fifth aspect, the invention provides a control interface for a stairlift, said interface being displaceable in a vertical plane and being biased into an upward position.

Preferably said interface is pivotally mounted with respect to an armrest of a stairlift chair.

In a sixth aspect the invention provides a stairlift including the chair and/or control interface as set forth above.

In a seventh aspect the invention provides stairlift assembly including:

a rail;

a carriage mounted for movement along said rail;

drive means within said carriage for driving said carriage along said rail;

a chair mounted on said carriage ;

and at least one hand operated control whereby an occupant of said chair can control the operation of said drive means,

said stairlift assembly being characterized in that a sensor is provided to sense when a user is occupying said chair, said sensor being further operable to isolate and energise said hand operated control.

In an eighth aspect the invention provides a stairlift assembly including:

a rail;

a carriage mounted for movement along said rail;

drive means within said carriage for driving said carriage along said rail;

a chair mounted on said carriage ;

at least one hand operated control whereby an occupant of said chair can control the operation of said drive means;

an isolation switch to isolate the power supply to said stairlift

said stairlift assembly being characterized in that said isolation switch is incorporated into said hand operated control.

Many variations in the way the present invention can be performed will present themselves to those skilled in the art. The description which follows is intended as an illustration only of one means of performing the invention and the lack of description of variants or equivalents should not be regarded as limiting. Wherever possible, a description of a specific element should be deemed to include any and all equivalents thereof whether in existence now or in the future. The scope of the invention should be limited by the appended claims alone.

Brief Description of the Drawings

One preferred form of the invention will now be described with reference to the accompanying drawings in which:

Figure 1: shows a side elevation of a stairlift assembly incorporating a chair embodying the invention:

Figure 2: shows an enlarged view of the control interface incorporated in the chair shown in Figure 1:

Figure 3: shows an under view of that which is shown in Figure 2:

Figure 4a: and 4b show isometric views of the body parts which define a control interface in two alternative configurations:

Figure 5: shows a sectional view through the control interface when in the configuration shown in Figure 4b;

Figure 6: shows a side view of a users arm and hand in contact with a control interface as described herein;

Figure 7: shows a control interface according to the invention underlying the palm of a user's hand;

Figure 8: shows a side view of a stairlift armrest to which is fitted a control interface according to the invention, and illustrating an alternative operating mode;

Figure 9: shows a front view of that which is shown in Figure 8; and

Figure 10: shows a top view of a stairlift chair fitted with a control interface according to the invention.

Detailed Description of the Working Embodiment

According to the invention a control interface for a stairlift is provided whereby an occupant of the stairlift, having limited manual dexterity, can safely and confidently control the movement of the stairlift carriage along the rail. The same interface may simplify the task of isolating power to the stairlift and give a clear tactile signal to the

user when the stairlift is isolated. As described herein, this invention also includes an aspect intended to avoid inadvertent operation of the stairlift, particularly when the user is mounting or dismounting the stairlift chair.

Referring firstly to Figure 1 a stairlift assembly 10 is shown comprising a carriage 11 mounted on a rail 12 for movement there along. Mounted, in turn, on the carriage, is a chair 13. In common with conventional stairlift chairs, the chair 13 has a pair of spaced armrests, one of which is shown at 14. Mounted on or adjacent the outer end of the armrest 14 is a control interface 15. As will be described in greater detail below, the control interface 15 is a unit discrete from the armrest 14 though is conveniently mounted on the armrest and is positioned for contact and displacement by a user 16 seated in the chair 13. The chair 13 further includes a footrest 13a which is shown in Figure 1 in the folded position. Indeed the armrests 14 may also be folded into vertically upright positions so that, when the stairlift is not in use, maximum clearance may be provided for foot traffic on the staircase.

As can be seen in Figures 2 & 3, the control interface 15 comprises a generally ovoid-shaped body member 17 having a substantially plane or slightly curved upper surface 18, the surface 18 being shaped for comfortable receipt in the palm 19 of a user's hand 20 (seen more clearly in Figure 6). The body 17 is pivotally mounted at 22 to a spigot 23. This arrangement allows the control interface to pivot in a first plane which is substantially horizontal when the control interface is in its operating position as shown in figure 6. The spigot 23 is, in turn, pivotally mounted at 24 to mounting bracket 26. As will be described in greater detail below, the axis 24 is, in use, positioned to lie substantially beneath the wrist axis 28 of the user and allows the control interface to pivot in a substantially vertical plane. It will be appreciated that the pivots 22 and 24 enable the control interface to be displaced in orthogonal planes.

In accordance with one aspect of this invention, the position of the control interface 15 is adjustable with respect to the armrest. In the particular embodiment described

herein, this is achieved by making the mounting bracket 26 slidable within armrest 14. The armrest 14 and bracket 26 may be formed in any suitable manner to achieve this, the precise inter-relationship of the components not forming part of this invention. A suitable clamping arrangement (not shown) is also provided to clamp the bracket 26 with respect to the armrest, when the desired position is achieved.

At installation, the intended user of the chairlift assembly is seated in the chair and the armrests positioned so that the user's elbows are angled comfortably and the forearms rest comfortably on the armrests 14. The position of chair bracket 26 is then adjusted within one of the armrest 14 so that the control interface is positioned conveniently beneath the palm of the user's hand and the user's wrist axis 24 is positioned substantially vertically above pivot 24 of the interface. The seat bracket 26 is then locked in position.

The position of the interface may be varied other than for the ergonomic reasons described above. In installations on very narrow staircases, it may be necessary to draw the interface back, and/or set the interface at an angle as shown in Figures 3 & 10, to provide sufficient clearance between the stairlift installation and the staircase wall.

A torsion spring or the like (not shown) is included within or adjacent pivot 24 to bias the body 17 into an upper position as shown in Figures 1, 2 & 8. In one mode of operation, the weight of the user's hand acts against this bias to displace the body into a lower position. This mode of operation is shown in Figures 6 & 7 and, as can be seen, the user's hand can comfortably envelop the top and the sides 28 of the body 17 and, if it is comfortable to do so, the front as well. The sides of the body, which may also have a small degree of curvature, are aligned substantially perpendicular to the general plane of the upper surface 18.

One alternative operating mode enabled by the invention is shown in Figures 8 and 9. In this mode the hand is not placed on the interface 15 but, instead, is placed along

side. Since the interface is biased upwardly, the side surfaces 28 of the control are conveniently position to allow the interface 15 to be operated safely and comfortably using the side of the hand. This mode of operation is particularly useful for those users who find it difficult to open the palm of the hand as is the case with some arthritis sufferers.

It will be appreciated that, when the body part 17 is in the lower of its two positions as shown in Figure 6, the upper surface 18 of the body part 17 provides a substantially natural extension of the upper surface of the armrest 14. That is not to say that the upper surface 18 is exactly co-planar with the upper surface of armrest 14 but that, when the user's forearm is positioned on the armrest 14, the user's hand will fall naturally into contact with the upper surface 18. This is unlike the conventional joysticks which require manipulation of the wrist to a substantial extent. Further, because the control interface is substantially planar and has some degree of width, the control interface contacts a substantial part of the user's hand. This avoids the point loading imposed by a joystick in the event a user bears down on the control and allows a user to support themselves by resting on the interface 15 when mounting or dismounting from the stairlift.

The ability of the interface to pivot in a vertical plane can have a further benefit to the user when backing into the chair to mount the stairlift. In such a situation it is usual for the user to move their arms behind their back, rest their hands on the armrests, and then move back into the chair. If one hand falls into contact with the control interface which then gives under the weight of the user's hand, the user is prompted to move that hand back into contact with the armrest.

As can be seen in Figure 7, the interface 15 underlies a substantial portion of the palm of a user's hand, in the form shown at least 50%.

As discussed in the background above, a problem with existing stairlift controls is that they can be operated inadvertently. This is most likely to occur when the user is

mounting, or dismounting from, the stairlift chair. With this in mind, according to another aspect of the invention, a sensor is provided to sense when the user is seated in the chair. This sensor is provided in circuit with the operating controls so that the control interface is only functional when the user is seated in the chair. This form of isolation could be provided in combination with any form of stairlift control, and not just with the particular form of control interface described herein.

In the form shown herein, the sensor comprises load sensor 29 provided in the chair base. A signal from the load sensor 29 is fed into the main operating control unit (not shown) which isolates the control interface 15 when the load sensor indicates that the chair is not occupied.

Turning now to Figures 4a and 4b, it will be noted that the body part 17 is formed in two parts 31 and 32, the two parts being displaceable, and preferably rotatable, with respect to one another. When in the operating position, as shown in Figure 4b, the two parts provide one smooth contiguous body. However, when the stairlift is to be disarmed, the forward body part 32 is rotated with respect to the fixed body part 31. As can be seen from Figure 5, embodied within the body 17 is a key assembly, the head of the key 33 being retained in the forward body part 32. Thus the forward body part can be withdrawn to prevent unauthorised use of the stairlift. It will be appreciated, however, that the bulk of the forward body part allows easy manipulation of the key lock by persons having limited hand dexterity. It will also be appreciated that, when the key is in the 'off' position as indicated in Figure 4a, the non-alignment of body part 32 gives a clear visual and/or tactile message to a user that the stairlift is immobilised. Thus a user can tell, at once, if the stairlift control is not configured for use. This applies whether the chair is extended or folded. Since the isolation control is carried on the end of the interface it is fully visible at all times. This is in contrast to existing arrangements in which the control is located under the armrest and is thus, at best, only partially visible when the armrest is in the down or operative position.

Referring, finally, to Figure 10, it will be noted that the interface 15 may be angled inwardly with respect to the axis of the armrest 14 so that the alignment of the interface 15 is at an angle α to the axis of the armrest 14. This angle α may be up to about 45° and is intended to provide additional clearance between the control and the wall on narrow staircases. More particularly, the combination of the forward/aft movement described above, and the adjustment through angle α, allows both the needs of the user and the limitations of a particular staircase, to be accommodated.

In use, a stairlift user 16 mounts the stairlift chair 13 in the conventional manner though no harm will be done, or discomfort experienced, if the user supports himself on the interface 15 whist moving into the chair. Once seated in the chair 13, the user's presence will be sensed by sensor 29 and the control 15 enabled. If the interface 15 still does not operate, the user will readily be able to determine if the key switch is in the off position by the mis-alignment of body parts 31 and 32, and the tactile sensation imparted to the hand thereby.

With the control 15 energised, the user may power the carriage along the rail by applying the weight of the hand to the upper surface 18 of the interface, and pivoting the same about axis 22. The direction in which the interface is pivoted determines whether the carriage moves up or down the rail.

If the user finds it uncomfortable to bear down on the interface with the weight of his hand, then the interface may be allowed to remain in the up position, whereupon the user may nudge the interface about axis 22 using the side of his hand against the side of the interface. Obviously which side of the hand is applied against which side of the interface will determine the direction in which the carriage moves.

It will thus be appreciated that present invention provides a novel yet extremely useful form of control interface for a stairlift assembly which eases the entry on to, and exit from, the stairlift chair whilst providing easy operation of the stairlift by persons having limited hand dexterity. Further, the embodiment described herein provides a novel and inventive solution for avoiding inadvertent operation of the stairlift.

Claims

1. A stairlift chair including a pair of arm rests, each of the said arm rests having an upper surface; and a control interface mounted on one of said arm rests, said chair being characterized in that said control interface has a palm contacting surface displaceable in to a plane which is substantially co-incident with the upper surface of the arm rest to which said interface is attached.

2. A stairlift chair as claimed in claim 1 wherein said control interface is displaceable with respect to orthogonal planes.

3. A stairlift chair as claimed in claim 1 or claim 2 wherein said control interface is constructed and arranged to avoid point loading on a user's palm when in use.

4. A stairlift chair as claimed in any one of claims 1 to 3 wherein said control interface has a substantially planar upper surface and side surfaces aligned substantially perpendicularly to said upper surface.

5. A stairlift chair as claimed in any one of the preceding claims wherein said arm rest has a longitudinal axis, the position of said control interface being adjustable along said longitudinal axis.

6. A stairlift chair as claimed in claim 5 wherein said control interface has a major axis, said major axis being angled to said longitudinal axis in a horizontal plane.

7. A stairlift chair as claimed in any one of the preceding claims wherein said control interface is biased upwardly out of the plane of said armrest.

8. A stairlift chair as claimed in any one of the preceding claims wherein a power isolation switch is embodied in said interface.

9. A stairlift chair including an arm rest having an inner end, an outer end, and a longitudinal axis; and a control interface positioned on or adjacent said outer end of said armrest, said chair being characterized in that the position of said control interface is adjustable along said longitudinal axis.

10. A stairlift chair as claimed in claim 9 wherein said control interface is displaceable with respect to orthogonal planes.

11. A manually engageable control interface for a stairlift, said interface being characterized in that it is discreet from a chair armrest and includes a palm contacting surface constructed and arranged to avoid point loading on a user's palm, when in use.

12. An interface as claimed in claim 11 including side surfaces to permit smooth contact by the side of a user's hand.

13. An interface as claimed in claim 11 or claim 12 wherein said palm contacting surface is constructed and arranged to underlie at least 50% of the area of a user's palm.

14. A manually engageable control interface for a stairlift, said interface including a body member engageable in the palm of a user's hand when said stairlift is in use, said interface being characterized in that said body member is formed in two parts which are displaceable with respect to one another such that, in a first configuration of said two parts, said control interface is inactive.

15. An interface as claimed in claim 14 wherein, when said body parts are in said first configuration, the resulting form of said body differs visually and/or provides a different tactile sensation to the user's hand than when said body parts are in an operative configuration.

16. A control interface for a stairlift, said interface being displaceable in a vertical plane and being biased into an upward position.

17. An interface as claimed in claim 16 being pivotally mounted with respect to an armrest of a stairlift chair.

18. A stairlift including the chair and/or control interface as set forth above.

In a seventh aspect the invention provides stairlift assembly including:

a rail;

a carriage mounted for movement along said rail;

drive means within said carriage for driving said carriage along said rail;

a chair mounted on said carriage ;

and at least one hand operated control whereby an occupant of said chair can control the operation of said drive means,

said stairlift assembly being characterized in that a sensor is provided to sense when a user is occupying said chair, said sensor being further operable to isolate and energise said hand operated control.

19. A stairlift assembly including:

a rail;

a carriage mounted for movement along said rail;

drive means within said carriage for driving said carriage along said rail;

a chair mounted on said carriage ;

at least one hand operated control whereby an occupant of said chair can control the operation of said drive means;

an isolation switch to isolate the power supply to said stairlift

said stairlift assembly being characterized in that said isolation switch is incorporated into said hand operated control.

ABSTRACT

Stairlift Control Interface

The invention provides a hand-operated interface through which a stairlift user can control the operation of the stairlift. The interface is configured for comfortable reception in the palm of the hand and its position may be adjusted with respect to the armrest of the stairlift chair to best suit the arm length of the user. The interface may also incorporate an isolation switch which provides both a visual and a tactile indication of whether or not the stairlift controls are activated for use.

(Use Figure 1)

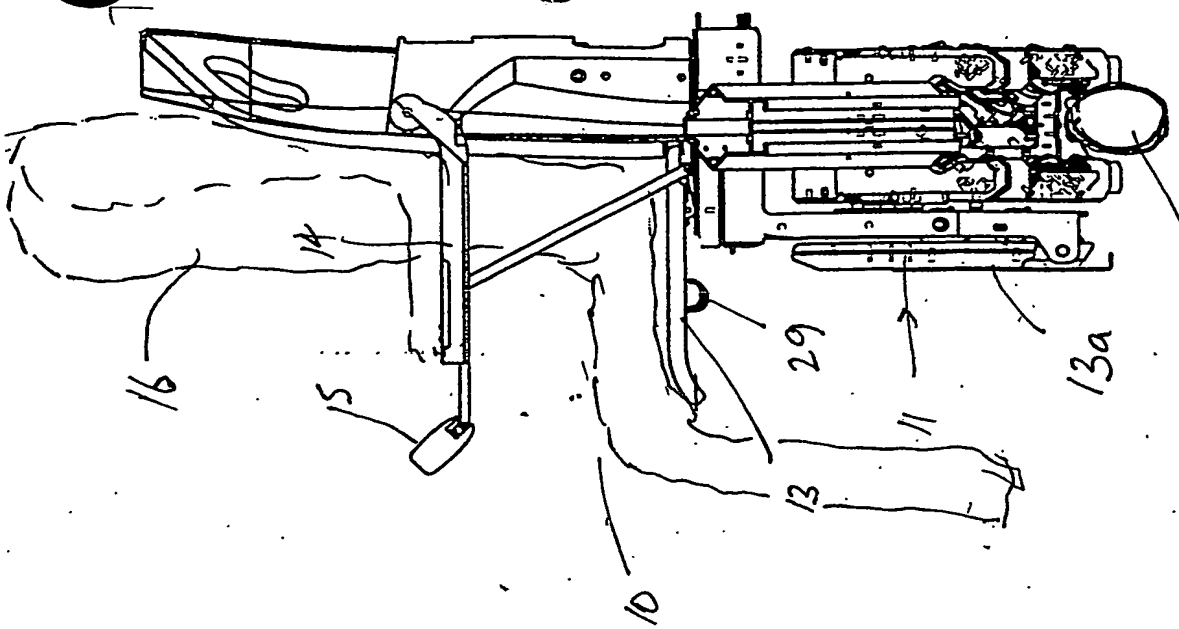


FIGURE 1

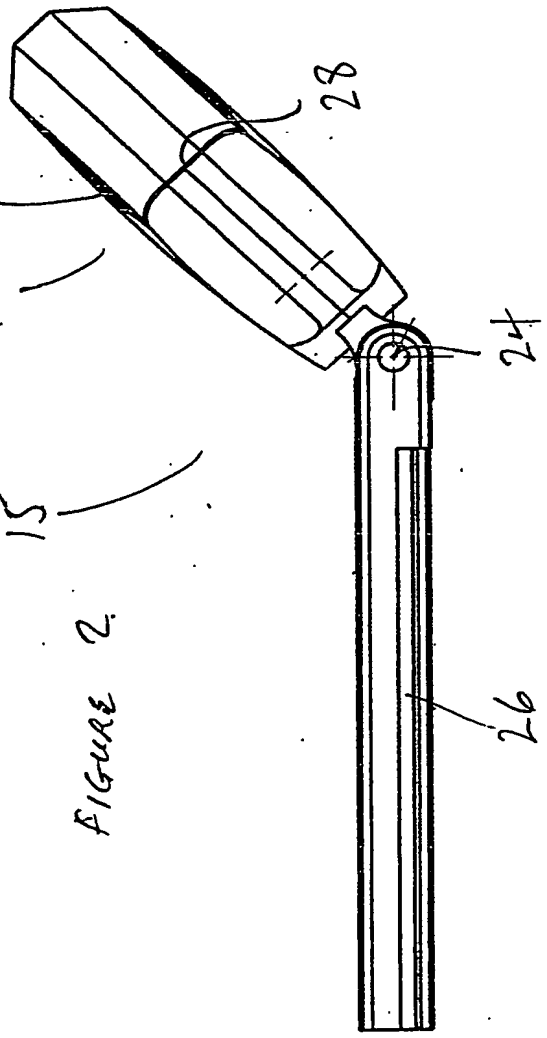


FIGURE 2

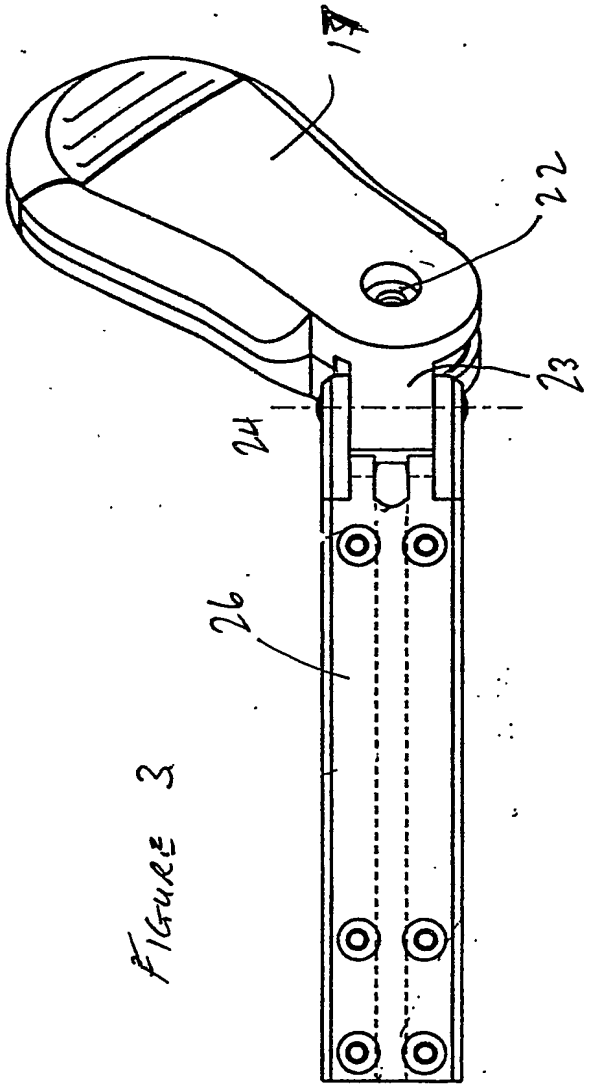


FIGURE 3

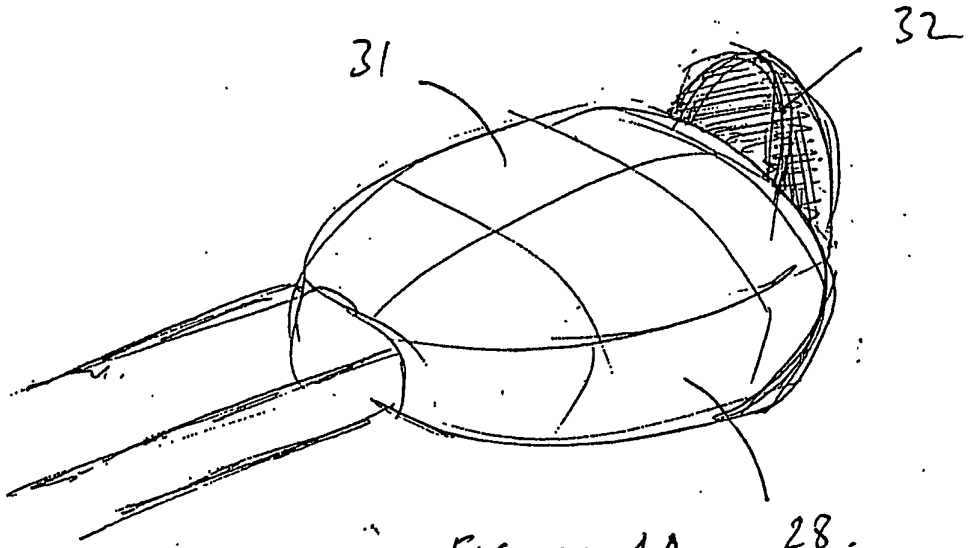


FIGURE 4A

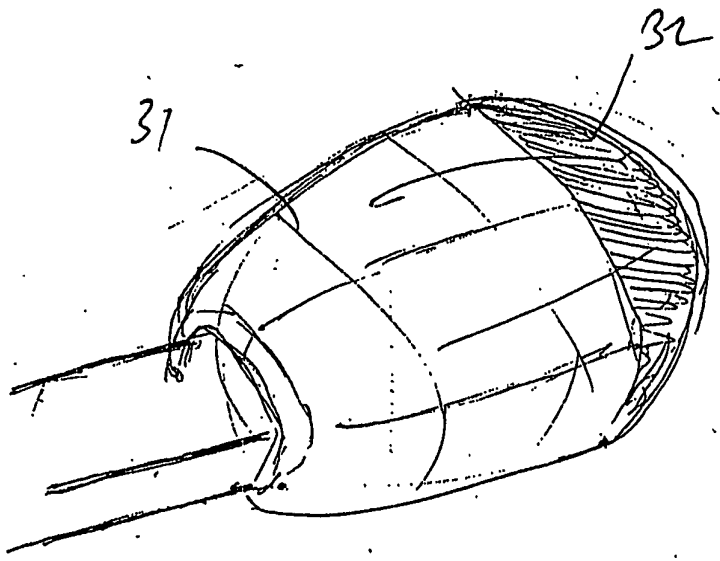


FIGURE 4B.

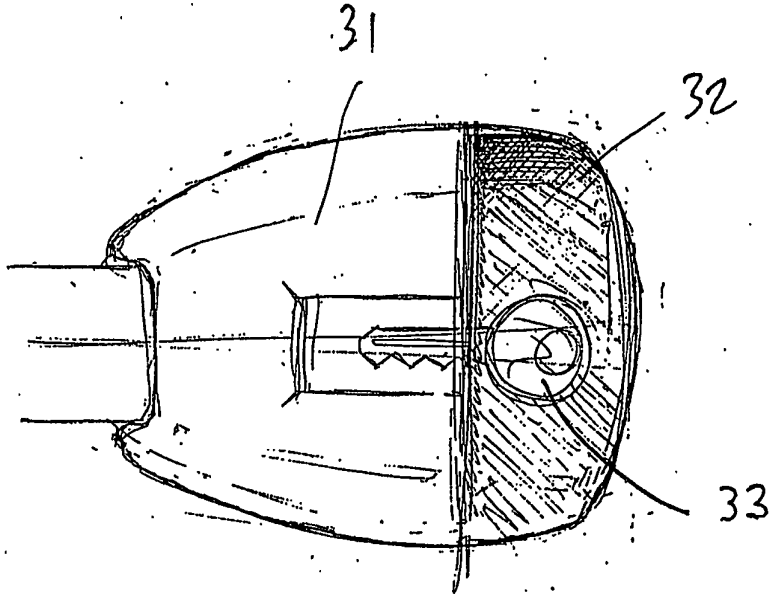


FIGURE 5

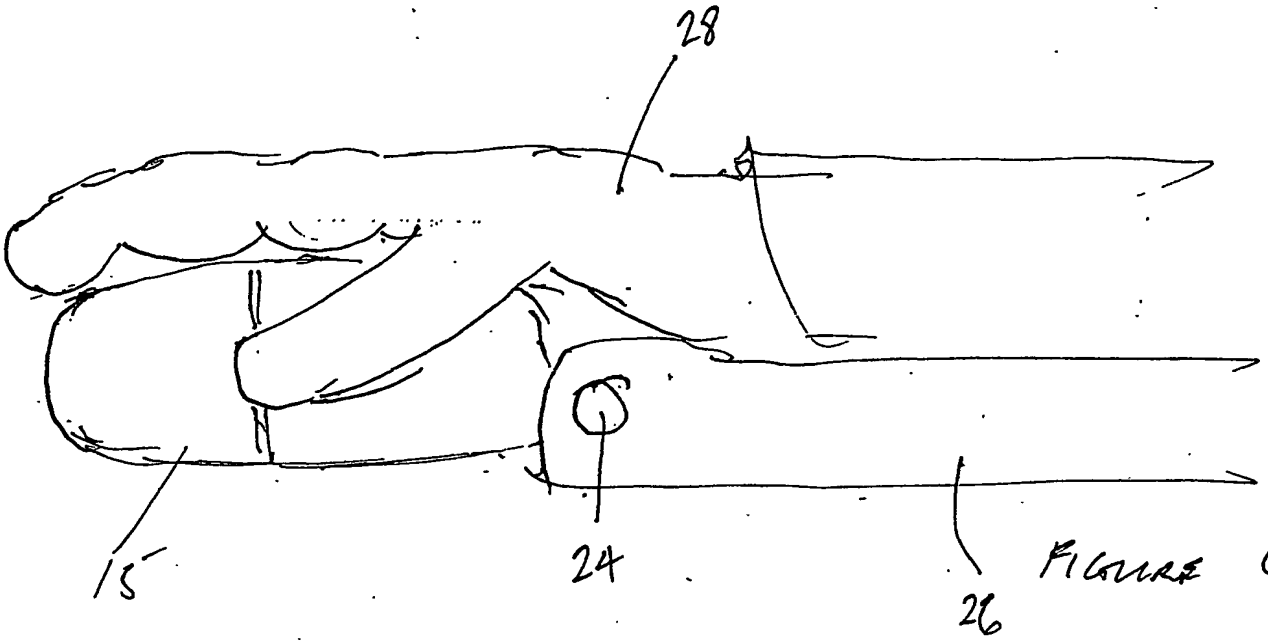


FIGURE 6

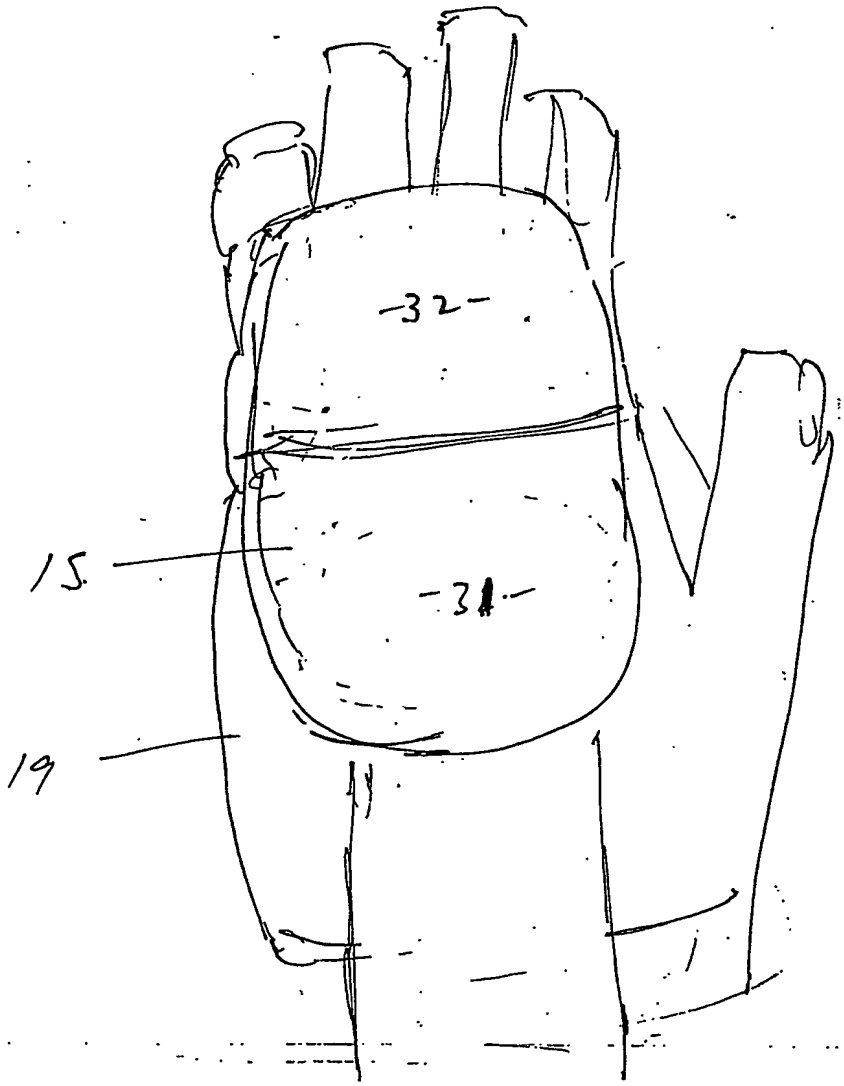


FIGURE 7

FIGURE 8

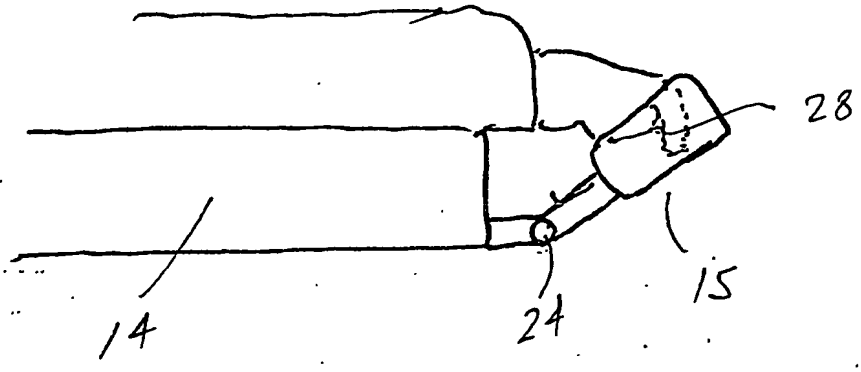
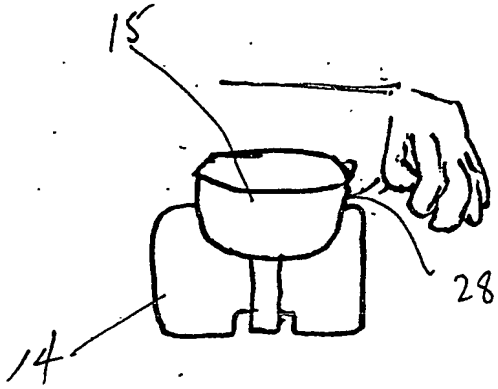


FIGURE 9



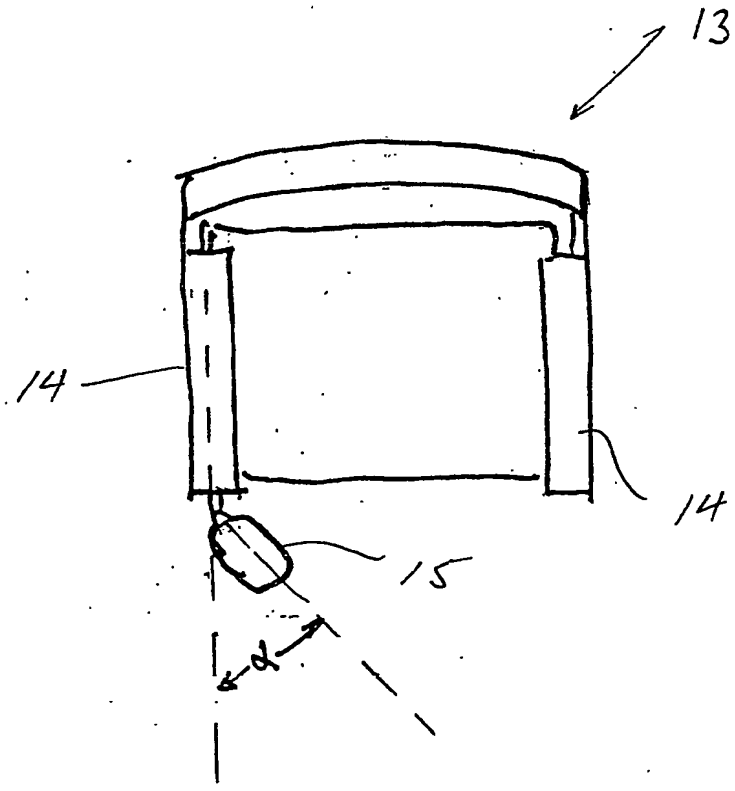


FIGURE 10

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